

V. (s.s.) leucozonias (Gm.), *f. striatella* Pils., ground [EBL-dead, EEJ, EJ3, EJF-dead; caught eating young *Pleurodonte ingens* and *P. lucerna acuta*].

V. (Varicellina) vicina (C.B.A.), but larger and stouter [VW2-fresh]; subsp. *portlandensis* H.B.B., rock-bases [EEJ, EJ].

V. (Sigmataxis) procera (C.B.A.), ground in brush [EEJ-fresh, KF, KH, ML2-fresh, MM3, MN2-dead; very light but rarely with indistinct varices]. *V. paupercula* (C.B.A.), ground in brush and open, incl. typical [VC; light horn color, usually with bright chestnut varices], intermediate size [KH, WWF-fresh; varices bright] and race *tumens* H.B.B. [MM4, MN, NMM, NM2a; lighter, varices obsolescent]. *V. laeviusculus* (C.B.A.), ground in brush [VCM, WV-dead, KHWA-fresh; very light colored with light chestnut varices]. *V. cylindrica* H.B.B., ground [EEJ-living; EJ1,3, EJF-fresh]. *V. micans* (C.B.A.), ground, epidermis quite thick, rich horn colored, incl. large [VW2; some lack varices and have close striae full length (typical); others attain 12 mm. long with $7\frac{3}{4}$ wh., develop more widely spaced striae on last whorl and have chestnut varices] and small races [VWS; 8.7 mm. long with $6\frac{1}{4}$ wh. and bright varices]. *V. perstriata* Pils. [MN2-fresh; slightly smaller; bright amber color with vague varices]. *V. subaquila* H.B.B. [VWS-fresh].

NOTES ON THE PECTINIDAE OF HAWAII

BY LEO GEORGE HERTLEIN

Specimens of three species of *Pecten* from the Hawaiian Islands were recently presented to the California Academy of Sciences by Mr. Theodore T. Dranga. The species represented are *Pecten noduliferus* Sowerby, *Pecten cuneatus* Reeve, and *Pecten loxoides* Sowerby. These species appear not to have been reported heretofore from the Hawaiian Islands, and it therefore seems desirable to record such occurrences.

The specimens of *P. noduliferus* were collected at Paumalu, on the Island of Oahu. The valves are in most instances ornamented by about nine striated ribs, which are only faintly nodu-

lous on the right valve, but are decidedly nodulous on the left valve. The shells are commonly red or yellowish red in color. The altitude averages about 23 mm. They agree in most particulars with the figures given by Sowerby,¹ and with specimens of *P. noduliferus* from Mauritius in the conchological collection at Leland Stanford Jr. University. One specimen of this species in that collection attains an altitude of 33 mm.

The species belongs to the section *Lyropecten* in a broad sense, or to *Nodipecten*, if that be considered a distinct section. *P. noduliferus* has also been recorded from Mauritius, Réunion Island, Seychelles, Madagascar, Zanzibar, Amirantes, and the Maldiva and Laccadive archipelagos.

The specimens of *Pecten cuneatus* were collected at Kaneohe Bay, Oahu, at a depth of five to fifteen feet, in Porites coral. The valves are covered by many fine ribs, between which occur finer riblets. The shells agree with Reeve's² figures and description, and are similar to a specimen of *P. cuneatus* from the Moluccas in the collection at Stanford University, which has an altitude of about 38.5 mm. Those from Hawaii average about 33 mm. in altitude. The color of the exterior of the Hawaiian shells is orange and brownish purple, and the interior is a purplish red. Specimens from coral dredged in Honolulu harbor,³ and stated by Mr. Dranga to be possibly subfossil, are much larger. The largest of those in the collection of the California Academy of Sciences measures 51 mm. in altitude. The ribs are relatively somewhat coarser, otherwise the shells are the same as those from Kaneohe Bay. *P. cuneatus* has also been recorded from the Moluccas, Torres Straits, Queensland, and Muscat on the Gulf of Oman.

This species in Hawaii appears to have been regarded by some workers as *P. albolineatus* Sowerby, but that is quite a different

¹ *Pecten noduliferus* Sowerby, Thes. Conch., Vol. 1, 1847, p. 64, pl. 13, figs. 38, 39, pl. 14, fig. 94: "Mr. Morris's collection."—Kobelt, Syst. Conch.-Cab., Bd. 7, Abt. 2, Lief. 354, 1887, *Spondylus* und *Pecten*, p. 210, pl. 56, figs. 5, 6, 7, 8: "Mauritius und Zanzibar."

² *Pecten cuneatus* Reeve, Conch. Icon., Vol. 8, 1853, *Pecten*, sp. 94, pl. 24, figs. 94a and 95a: "Moluccas." [*Pecten sibyllæ* described by Sowerby (Proc. Zool. Soc. London, 1882, p. 120, pl. 5, fig. 12), without locality, bears a resemblance to *P. cuneatus*.]

³ For a list of species dredged at Kewalo Harbor, Honolulu, see C. F. Mant, Nautilus, Vol. 36, No. 4, 1923, pp. 120-123.

species. Ostergaard⁴ has recorded *P. albolineatus* from the Pleistocene of Oahu. No specimens of that species were included in the present collection.

The specimens of *Pecten loxoides* Sowerby from Waimea Beach, Oahu, are about 19 mm. in altitude. They correspond so exactly to Sowerby's⁵ original description and figure that there seems little doubt as to the identity of the Hawaiian shells. The form is very oblique and the ears are small. The valves are ornamented by about 20 prominent, subrounded, smooth ribs. The right valve is white, the left is ornamented by brownish spots, roughly arranged in V-shaped patterns on the white background. Specimens of this species from Laysan Island, a northern unit of the Hawaiian group, are also present in the collections of the California Academy of Sciences. The largest specimen from that locality measures approximately 24.5 mm. in altitude.

Reeve has described *Pecten russatus*⁶ from Hawaii, but no specimens referable to that species have been noticed in any of the collections examined by the author. Prof. Junius Henderson⁷ pointed out that the specimens from Hawaii, referred by Bryan⁸ to *Hinnites giganteus* Gray, should be placed in the genus *Spondylus*. Probably they can be referred to *Spondylus zonalis* Reeve. A specimen of this species was among those presented to the California Academy of Sciences by Mr. Dranga. An interesting occurrence is that of *Pecten radula* Linnaeus which was collected by Mr. Dranga at Tutuila, Samoa.

⁴ *Pecten (Chlamys) albolineatus* Sowerby, Ostergaard, Bernice P. Bishop Mus., Bull. 51, 1928, p. 8, Oahu, Hawaiian Islands: Pleistocene.

⁵ *Pecten loxoides* Sowerby, Proc. Zool. Soc. London, 1882, p. 120, pl. 5, fig. 13: "Hab. Australia": Recent.—Kobelt, Syst. Conchyl.-Cab., Bd. 7, Abt. 2, Lief. 358, 1888, p. 266, pl. 70, figs. 3 and 4 (as *Pecten loxeoides*): Australia: Recent.—Dautzenberg & Bavay (Siboga Exped. Mon 53^b, 1912, p. 150 [24]), placed *P. loxoides* in the synonymy of *P. inaequalvis* Sowerby. [*P. loxoides*, however, appears to possess diagnostic features which warrant its retention as a separate species.]

⁶ *Pecten russatus* Reeve, Conch. Icon., Vol. 8, 1853, *Pecten*, sp. 126, pl. 29, fig. 126: "Hab. Sandwich Islands."—Kobelt, Syst. Conchyl.-Cab., Bd. 7, Abt. 2, Lief. 349, 1887, p. 167, pl. 46, fig. 6. Reeve's record cited.

⁷ NAUTILUS, Vol. 40, No. 3, 1927, p. 81.

⁸ Bryan, W. A., Nat. Hist. Hawaii, 1915, pp. 445, 457, pl. 104, fig. 13. Hawaii: Recent.